

- Pachycephala caledonica* 20.9±1.3 (18.0–23.0, N=17)
Pachycephala rufiventris xanthetreae 18.2±1.8 (15.5–23.0, N=20); ♂
 18.4±1.5 (16.5–22.0, N=11); ♀ 17.6±1.5 (15.5–19.0, N=7)
Zosterops lateralis griseonota 11.6±0.9 (10.5–13.0, N=7)
Zosterops xanthochroa 10.3±0.9 (8.5–12.0, N=46); ♂ 10.4±0.8 (9.0–12.0,
 N=18); ♀ 9.9±0.8 (9.0–11.5, N=13)
Gymnomyza aubryana ♂ 211.0, 230.6, 284.2; ♀ 151.8, 159.3 (from Warner
 1947)
Lichmera i. incana 13.1±2.0 (9.5–14.5, N=8)
Myzomela sanguinolenta caledonica ♂ 7.5, 8.2; ♀ 6.9, 6.6
Philemon diemenensis 69.3±8.9 (53.0–84.0, N=22); ♂ 74.5±3.9 (69.5–
 84.0, N=9); ♀ 53.0, 55.0, 56.0, 62.0, 62.0, 62.0
Phylidonyris undulata ♀ 16.0
Erythrura psittacea ♂ 11.5

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Variation in the Ground Woodpecker *Geocolaptes olivaceus*

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The endemic austral African Ground Woodpecker *Geocolaptes olivaceus* (Gmelin), 1788: Cape of Good Hope, is restricted to the Cape Province south of the Orange R., extending north of this in the east of its tenuous

range to reach the Transvaal Drakensberg (to about Lydenburg). It favours mountains and karoooid country, even the most eroded and stony, in the western sector of its range, but to the east over the southeastern highlands it affects the slopes of grassed hills and mountains, breeding to as high as the alpine zone of the Lesotho/Natal Drakensberg (above c. 2865 m a.s.l.) during October and November (Brown & Barnes 1984). In the western and central parts of the Cape it starts to breed rather earlier, from about August (see McLachlan & Liversidge 1957). While generally considered to be a local nomad, evidence from the eastern parts of its range reveals marked seasonal movement, as Drakensberg alpine zone breeders are absent from the nesting grounds in winter, and at this time it has been taken well to the north and west of its established breeding distribution in the Transvaal in July. In a recent study it has been found to occur seasonally in districts in the Orange Free State where it has not been found to breed. Evidence for more than local nomadism in the present woodpecker is currently restricted to areas peripheral to the Drakensberg system in the east of its distribution, and may be confined to such eastern elements.

The phylogenetic background to *G. olivaceus* is still unresolved, but its origins are assuredly Afrotropical and it is probably descended from a primitive ancestor of the same lineage as the contemporary *Campethera* assemblage of African arboreal woodpeckers. This revised opinion is lent support by its largely allopatric and southwestern oriented terminal distribution in relation to that of comparably sized arboreal picids occurring in the Subregion.

Geographical variation in the Ground Woodpecker was first alluded to by P. L. Sclater (1866) and demonstrated in more recent times by Meinertzhagen (1949), followed by Clancey (1952). In a short review of the variation as understood on the limited material then available Clancey (1957) admitted 5 races, but later (Clancey 1965) this was reduced to 3, which arrangement is the one adopted in the *SAOS Checklist of Southern African Birds* (Clancey 1980). In a recent study, Earlé (1986) viewed the marked variation west-east as strongly clinal and apparently unstepped, so much so that he felt that it should be considered to be a monotypic species. As the *modus operandi* employed in the 1986 appraisal did not address the variation between the juvenile and adult plumages and the modifying influences on specimens of the bird's environment and life-style (daily exposure to intense sunlight, soil staining and plumage erosion through the use of roosting and breeding tunnels in banks), I have felt it necessary to re-examine the situation, using the greater number of specimens in southern African collections. Furthermore, the possible presence of a definable contact zone between the colour extremes was not considered. Earlier, I examined the series in the collection of the British Museum (Nat. Hist.), Tring.

Broadly speaking the geographically relevant variation falls into 2 broad categories which are correlated with the widely differing climatic and ecological regimes covered by its distribution, which spans from 17°45'E to 31°00'E. As will be appreciated from Table 1, size variation west-east of taxonomic import does not exist, but on the other hand colour and pattern differences are well-marked, and by ignoring these

TABLE 1

Wing- and culmen-lengths (mm) of adults of various populations of the southern African Ground Woodpecker *Geocolaptes olivaceus* (Gmelin).

Region	Wings flattened of ♂♀				Culmens of ♂♀			
	n	Range	\bar{X}	SD	n	Range	\bar{X}	SD
1. W. Cape	29	125-137	131.8	3.52	17	38-42	39.5	1.12
2. C. Cape	10	126-134	130.5	2.32	10	36-43	39.8	2.61
3. E. Cape	36	125-136	130.2	2.45	34	36.5-44.5	40.8	1.90
4. Lesotho	7	125-135	128.7	3.76	7	38.5-42.5	40.4	1.51
5. Natal	7	127-134	129.1	2.34	7	31-42	37.5	3.49
6. O.F.S.	3	130-133	131.5	1.50	3	38.5-41	39.8	1.25
7. Transvaal	6	126.5-132.5	130.0	2.66	6	38-45	39.8	2.65

It will be noted that little variation of taxonomic relevance is present in these morphological parameters west-east, apart from a trend to shorter wing-length in the southeastern Summer Rainfall District, samples 4 & 5. The minimal variation seen in culmen-length is probably a correlate of the nature of the substrate or seasonal activity or both. The high standard deviation in the Natal sample is occasioned by the very short bill of an example of *G. o. petrobates* from Giants Castle Game Reserve on the Lesotho/Natal border.

In the case of the W. Cape sample, the wing-length norm ranges 130-137 mm (79.31%), those with wings down to 125 mm (20.68%) probably retaining remiges of the juvenile dress. This is equally true of the other populations.

differences in the taxonomic arrangement of the species much of evolutionary significance is lost.

The populations of the Winter Rainfall District (Mediterranean-type climate) of the southwestern Cape—topotypical of *G. olivaceus*—and the interior Karoo regions are characterized by their dark brownish grey pileum and saturated olive-brown back, marked with short broken bars and spots of yellowish white. Ventrally, the fore-throat is dusky and the upper breast furnished with a relatively well-defined band of light olivaceous brown, freckled with yellow or greenish white. The mid-venter is extensively deep crimson and the flanks are heavily barred or scaled with brown on buff. In the west, birds agreeing with this diagnosis extend from the Cape Peninsula, north to Springbok in Little Namaqualand, and range as far east as c. 25°50'E. They constitute the nominate subspecies *G. o. olivaceus*.

To the immediate east of the populations just dealt with, a marked change in colour facies in association with the climatic shift from a winter to summer rainfall regime is present, the phenotypic variation manifest in the lighter grey head-top, paler, more olive, less dark brown, back, lighter fore-throat and mid-breast and dilute mid-ventral red. It was to the characters of this population that Sclater (1866) first drew attention when he used *Geocolaptes arator* (*Picus arator* Cuvier, *Régéné Anim.*, i, 1817: 423: western Cape) for material from the Windvogelberg in the Cathcart Division of the eastern Cape. Study of the reasonably adequate material of this eastern Cape population shows that it is the result of a secondary contact between the nominate subspecies and elements occurring still further east in South Africa. These more eastern birds, in the case of those

breeding in the southeastern highland massif of Lesotho and adjacent territories, are separable from those of the secondary contact zone by having (or showing a reversion to) a darker (bluer) grey pileum and a plain dark earthen brown back. Ventrally these high montane breeders are similar to those of the contact zone, differing, as described, in their darker and unfreckled dorsal surfaces. To this population the name *G. o. petrobates* Clancey, 1952, is applicable.

Lying peripherally to *G. o. petrobates* and present at lower altitudes from the interior of Natal to the Orange Free State and the southern and eastern Transvaal occur birds which differ again in the pale head-top (as in eastern Cape examples), the yellowish olive back largely immaculate. Ventrally they are appreciably whiter from the fore-throat to the breast, the breast-band vestigial laterally, while the mid-ventral pink is clearer and the barring of the flanks much lighter. This discrete population was initially detected by Austin Roberts, but was named in 1952 by the present author as *G. o. prometheus*. This race is subject to a measure of winter movement which takes it beyond the established limits of its breeding range, but the extent of such vagility remains to be determined.

From this re-assessment of the variation occurring in *G. olivaceus* it is clearly evident that at some stage in the species' evolutionary history the populations were isolated into western (largely karoooid) and eastern (grassed Afromontane) groups, coming together in more recent times to form a secondary contact zone in the eastern Cape. The species' distribution as shown on map 383 in Snow (1978) with clusterings of locality records in the southwest and the east of the range is further evidence of a former polarization of populations into western and eastern isolates. The pattern of variation is not clinal (in the strict Huxleyan sense). Indeed, clinal variation in southern Africa, with its differing climates and complex mosaic of biomes, is a relatively rare phenomenon in such mobile organisms as birds.

The eastern Cape intergrades which are present between 25°50' and 27°35'E do not constitute a satisfactory taxonomic unit, showing introgression by genes of nominate *olivaceus* over the venter in many, while all have the mantle and scapulars freckled with yellowish white when fresh—a further indicator of genetic affinity with the said race. In the circumstances, such secondary contact intergrades should be associated with it and the name *G. arator* (Cuvier), as employed by Sclater (1866), left in its synonymy.

The geographical variation of the Ground Woodpecker is satisfactorily represented by 3 subspecies and the recognition of a definable zone of secondary contact between the markedly different western and eastern phenotypes, the revised characters and ranges of the 3 subspecies being as hereunder given.

(a) ***Geocolaptes olivaceus olivaceus*** (Gmelin), 1788: Cape of Good Hope, Cape Province.

Synonyms: *Picus arator* Cuvier, 1817: South Africa (here restricted to the western Cape Province).

Picus terrestris Burchell, 1822: near Windheuvél, Karoo, Cape Province (see Davis & Hull 1983).

Geocolaptes olivaceus theresae Meinertzhagen, 1949: 10 m



Figure 1. Sketch-map showing the disposition of the 3 racial groupings of populations of the Ground Woodpecker in southern Africa

1. *Geocolaptes olivaceus olivaceus* (Gmelin). Karoooid.
2. *Geocolaptes olivaceus petrobates* Clancey. Montane karoooid.
3. *Geocolaptes olivaceus prometheus* Clancey. Montane; grassed slopes.

N of Springbok, Little Namaqualand, NW Cape Province (see "Remarks" below).

Crown deep brownish grey; back saturated olive-brown (Saccardo's Olive—see Ridgway 1912) marked with short, broken bars and spots of yellowish white. Throat dusky; upper breast with band of light olive-brown, speckled with yellow or white; mid-venter extensively saturated Scarlet Red, the flanks barred dark brown on buff.

Range. Cape Province from the Peninsula north to Little Namaqualand, and east to c. 25°50'E. East of this, intergrades broadly in the eastern Cape and southwestern Orange Free State with *G. o. prometheus* and *G. o. petrobates*, the zone of secondary contact lying between 25°50' and 27°35'E.

Remarks. The description of *G. o. theresae* resulted from a comparison between Little Namaqualand specimens and others from the east of the species' range rather than with topotypes of the nominate race from the Cape of Good Hope.

(b) *Geocolaptes olivaceus petrobates* Clancey, 1952: confl. of Malaoaneng and Little Bokong Rivers, Lesotho.

Compared with last, crown bluish grey; back plain dark earthen brown (about cold Brownish Olive) without broken bars and spots of yellowish white. Throat and mid-breast whiter, and mid-ventral red paler, more pinkish (Peach Red/Scarlet). Wings darker.

Range. High country of northeastern Cape and adjacent Transkei (Naude's Nek Pass, Ben Macdhui, and Pitseng Pass, Mt Fletcher) to the

Maluti ranges of Lesotho and the high Drakensberg Mountain range on the Transkei and Natal borders with Lesotho. Breeds to as high as 3000 m (9840 ft) a.s.l., which heights are vacated in winter (see Brown & Barnes 1984).

Remarks. Named on 2 specimens from the type-locality. Recent material shows that 2 of the initial characters were founded on individual variation.

(c) ***Geocolaptes olivaceus prometheus*** Clancey, 1952: Woodbush Forest Reserve, Tzaneen, northern Transvaal.

Grey of head-top lighter than in the foregoing subspecies, and back paler, more yellowish, olive (Light Brownish Olive); largely immaculate. Throat and breast much whiter, with indications of a breast-band restricted to the sides; mid-ventral surface clearer pink than in *petrobates* (Strawberry Pink), and flanks with paler and reduced brown barring.

Range. Orange Free State, Transkei below the Drakensberg escarpment to the interior of Natal and southern and southeastern Transvaal north in the east to about Lydenburg. Records from further north (to Tzaneen) and west (to Pretoria) are of post-breeding wanderers.

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